

***Remarks***

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 1-16 are pending in the application, with claims 1, 10, and 11 being the independent claims. The changes incorporated in the foregoing amendment are believed to introduce no new matter, and their entry is respectfully requested.

Based on the above amendment and the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

***Objection to the Specification***

The Examiner objected to the specification for various informalities. These informalities have been corrected by the amendments above. Accordingly, Applicants respectfully request that the objections be withdrawn.

***Objection to the Title***

The Examiner stated that the title of the invention was not descriptive. Applicants wish to thank the Examiner for suggesting a title that is clearly indicative of the invention to which the claims are directed. The title has been changed to the suggested title in the amendment above.

***Objections to the Drawings***

The Examiner objected to the drawings under 37 CFR 1.83(a) for allegedly not showing every feature of the invention in the claims. Specifically, the Examiner stated that the drawings do not show a means for generating a radial electric field as stated in claim 9. Applicants respectfully point out that Figure 1 discloses first and second electric coils 32 and 34. The coils encompass vacuum chamber 11. Electric coils are well known in the art to produce electric fields. Also, the particular arrangement of the coils around the vacuum chamber 11 produce a radial electric field. Accordingly, the Applicants respectfully request that the Examiner withdraw the objections to the drawings.

#### ***Objections to the Claims***

The Examiner objected to claims 1-16 for various informalities and grammatical errors. These informalities have been corrected by the amendments above. These corrections are not related to patentability of the present invention and do not narrow the scope of the claims. Accordingly, Applicants respectfully request that the objections be withdrawn.

#### ***Rejections under 35 U.S.C. § 112***

Claim 14 has been rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter that was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The Examiner stated that the specification does not readily disclose how to steer the arc using the first magnetic field and in actuality the specification teaches that it is the coil located above the cathode, which generates the

second magnetic field, that steers the arc. The amendment to claim 14 has replaced "first" with "second". Accordingly, Applicants respectfully request that the rejection be withdrawn.

The Examiner has also rejected the claims under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicants regard as their invention. The rejection is a result of the confusion stemming from which magnetic field is the first magnetic field and which magnetic field is the second magnetic field. The amendment to claim 14 addresses and clarifies this point. Accordingly, Applicants respectfully request that the Examiner withdraw the rejection.

***Rejections under 35 U.S.C. § 102***

Claim 10 has been rejected under 35 U.S.C. § 102 (b) as being anticipated by EP document 0 495 447 A1 ("EP '447). The Examiner states that EP '447 discloses a cathodic arc source comprising a cathode 17, anode process chamber 14, means for generating a magnetic field 21, target 16, and the magnetic field generating a magnetic field at the front surface of the target and having a lateral field component effective to maintain the arc on the front surface of the target during operation. The foregoing amendment to claim 10 calls for "zero field strength at a position above the target and inside the chamber." The EP '447 document does not disclose zero field strength at a position above the target and inside the chamber. Accordingly, Applicants respectfully request that the Examiner withdraw the rejection.

Claim 10 has also been rejected under 35 U.S.C. § 102 (b) as being anticipated by the article "Physical and Technological Features of the Arc Vacuum System for Coatings

Deposition Based on the Plasma Arc Accelerator" to Semenyuk *et al.* ("Semenyuk") The Examiner states that Semenyuk teaches a cathodic arc source comprising a cathode, anode process chamber 2, means for generating a magnetic field within chamber 2, cathode station for location of a target 1 in electrical contact with the cathode, and the means for generating the magnetic field generates a magnetic field at the front surface of the target and having a lateral component effective to maintain the arc on the front surface of the target during operation. The foregoing amendment to claim 10 calls for "zero field strength at a position above the target and inside the chamber." Semenyuk discloses the point of zero field strength situated at or even below the target surface. See Figure 2b. Accordingly, Applicants respectfully request that the Examiner withdraw the rejection.

Claims 1, 9-11, and 13-16 have been rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,103,074 to Khominich. The earliest filing date of the Khominich patent is February 14, 1998. Applicants have claimed priority to the July 24, 1996 filing date of GB Application No. 9615548.6. (See discussion in *Other Matters* section below). A rejection under 35 U.S.C. § 102(e) requires that the invention disclosing the claimed subject matter be . . . described in a patent granted on an application for patent by another filed in the United States *before* the invention thereof by the applicant for patent . . . (emphasis added). Because Applicant's earliest filing date antedates the Khominich patent, Applicants respectfully request that the Examiner withdraw the rejection.

***Rejections under 35 U.S.C. § 103***

Claims 2-8 and 12 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Khominich. Again, the Khominich patent does not antedate the earliest filing date of the present application. Accordingly, Applicants respectfully request that the Examiner withdraw the rejection.

Claim 14 has been rejected under 35 U.S.C. § 103 (a) as being unpatentable over Khominich in view of U.S. Patent No. 5,468,363 to Falabella ("Falabella"). Again, the Khominich patent does not antedate the earliest filing date of the present application. Accordingly, Applicants respectfully request that the Examiner withdraw the rejection.

Independent claims 1 and 11 have been rejected under 35 U.S.C. § 103 (a) as being unpatentable over Semenyuk in view of Falabella. The Examiner states that Semenyuk discloses the elements of claims 1 and 11 of the present invention as described above but fails to disclose a graphite cathode source and a macroparticle filter. The Examiner further states that Falabella teaches use of graphite cathode sources, which is a well-known use. Additionally, the Examiner states that the motivation for selection of graphite as the cathode source is to deposit carbon films onto the substrate and it therefore would be obvious to modify the teachings of Semenyuk with Falabella. Finally, the Examiner states that Falabella teaches a macroparticle filter and because macroparticle filters filter macroparticles out of the plasma and thereby prevent macroparticle deposition on the part to be coated, it would have been obvious to modify the Semenyuk teaching with that of Falabella to include a macroparticle filter.

The Semenyuk device discloses a metal target and a point of zero field strength at or even below the target surface. It is well known in the field that arc spot motion differs with different target materials. Switching graphite for metal in the Semenyuk device,

with the point of zero field strength located at the target surface, would cause the arc spot to move to the edge of the target and possibly even to cross over to the other side. This would result in the plasma output immediately diminishing and may even cause damage to the screen field. Therefore, even if it were obvious to replace the metal target with a graphite target, doing so would result in an inoperative device.

Semenyuk states that his invention results in decreased generation of macroparticles because of the use of easy melting, low-thermal-conductivity materials. Additionally, Semenyuk's source must work without a filter to have the claimed advantages of high ion current, high intrinsic ion energy, high coating rate, and the substrate must receive all flux directly from the source to enjoy its claimed benefits. Semenyuk concludes that using a macroparticle filter is not practical because "[curved-line plasma optical] systems . . . decrease the output ion current 2 to 3 times, causing substantial decrease in efficiency." See page 871, column 2, lines 12-20. Semenyuk is essentially teaching a system that is an alternative to one using a macrofilter. Accordingly, Semenyuk is teaching away from using a macrofilter and therefore it would not have been obvious to modify the Semenyuk device with the teaching of Falabella. Accordingly, Applicants respectfully request that the rejection of claims 1 and 11 be withdrawn.

Claims 2-9 and 12-16 depend from and add features to claims 1 and 11 respectively and are therefore allowable at least for the same reasons as claims 1 and 11.

#### ***Other Matters***

The present application is a Continuation-In-Part of U.S. Application No. 09/230,354, now abandoned, which is a National Phase of International Appl. No.

PCT/GB97/01992. The international application claimed priority to GB Application No. 9615548.6, with a filing date of 24 July 1996. The International Bureau of WIPO received a copy of the GB priority document on 27 August 1997. Enclosed is a copy of Form PCT/IB/304 verifying receipt of the priority document by WIPO. Because the priority document was filed with the International Bureau, which should have sent a copy of the certified copy of the priority document to the U.S. Receiving Office, Applicants are not required to submit a certified copy of the GB application as otherwise required by 35 U.S.C. § 119(b). Applicants respectfully request that the Examiner verify that a copy of the priority application was forwarded to the U.S. Receiving Office in U.S. Application No. 09/230,354.

Additionally, the above amendment incorporates a specific reference to the prior applications to which this application claims priority. Accordingly, Applicants have complied with all the conditions for receiving the benefit of an earlier filing date under 35 U.S.C. § 120.

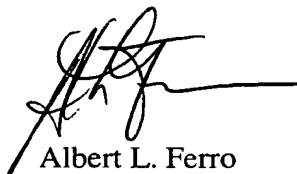
### ***Conclusion***

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

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**Version with markings to show changes made**

Marked-up version of claim 4:

4. (Once Amended) A source according to Claim 2 [for generating positive ions from a graphite target comprising means for generating a magnetic field] wherein:

[(1)] at [a] the front surface of the target, the field direction substantially normal to the front surface is towards the front surface;

[(2)] magnetic field strength in said direction decreases with increasing distance from the target to a point of zero field strength substantially normal to the front surface; and

[(3)] from said point of zero field strength, with increasing distance from the target, the field direction is away from the front surface of the target.

Marked-up version of claim 5:

5. (Once Amended) A source according to Claim[s] 2 [for generating positive ions from a graphite target comprising means for generating a magnetic field] wherein:

[(1)] at [a] the front surface of the target, the field direction substantially normal to the front surface is away from the front surface and towards the substrate;

[(2)] magnetic field strength in said direction decreases with increasing distance from the target to a point of zero field strength substantially normal to the front surface; and

[(3)] from said point of zero field strength, with increasing distance from the target, the field direction is towards the front surface of the target.

Marked-up version of claim 7:

7. (Once Amended) A source according to Claim 2 [in which] wherein at the point of zero field strength in a direction substantially normal to the target, a field strength in a direction substantially lateral to the target is at least 10mT.

Marked-up version of claim 10:

10. (Once Amended) A cathode arc source comprising:

a cathode;

an anode;

a vacuum chamber;

means for generating a magnetic field in the vacuum chamber;

a cathode station for location of a target in electrical contact with the cathode, said target having a front and a rear surface; and

means for striking an arc at the front surface of the target;

wherein the magnetic field generating means is for generating a magnetic field at the front surface of the target and wherein the magnetic field has a lateral field component effective to maintain the arc on the front surface of the target during

operation and a normal field component with direction substantially normal to the front surface of the target and zero field strength at a position above the target and inside the chamber.

Marked-up version of claim 14:

14. (Once Amended) A method according to Claim[s] 11 further comprising using the [first] second magnetic field to steer plasma from the arc through a macroparticle filter.

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